# Global evidence of extreme intuitive moral prejudice against atheists

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*Mounting evidence supports longstanding claims that religions can extend cooperative networks[1-9]. However, religious prosociality may have a strongly parochial component[9]. Moreover, aspects of religion may promote or exacerbate conflict with those outside a given religious group, promoting regional violence[10], intergroup conflict[11], as well as tacit prejudice against nonbelievers[12,13]. Anti-atheist prejudice—a growing concern in increasingly secular societies[14]—affects employment, elections, family life, and broader social inclusion[12,13]. Preliminary work in the USA suggests that anti-atheist prejudice stems, in part, from deeply rooted intuitions about religion's putatively necessary role in morality. However, the cross-cultural prevalence and magnitude—as well as intracultural demographic stability—of such intuitions, as manifested in intuitive associations of immorality with atheists, remain unclear. Here, we quantify moral distrust of atheists by applying well-tested measures in a large global sample (N=3256, 13 diverse countries). Consistent with cultural evolutionary theories of religion and morality, people in most—but not all—countries viewed extreme moral violations as representative of atheists. Notably, anti-atheist prejudice was even evident among atheist participants around the world. Results contrast with recent polls that do not find self-reported moral prejudice against atheists in highly secular countries[15], and imply that the recent rise in secularism in Western countries has not overwritten intuitive anti-atheist prejudice. Entrenched moral suspicion of atheists suggests that religion's powerful influence on moral judgements persists, even among nonbelievers in secular societies.*

Speculation about whether morality depends on religious belief has a long history. The ancient Chinese philosopher Mozi claimed that belief in ghosts was essential for

moral restraint[16]. In Plato's *Euthyphro*[17], Socrates debated whether morality can even be properly defined without reference to divine preference. Dostoevsky[18] famously questioned whether moral prohibitions could carry weight without belief in a deity. Modern investigations reflect this perceived link between belief in gods and morality, as recent small sample studies in North America suggest deep moral suspicion of individuals who do not believe in gods[13,19].

Evolutionary theories of religion predict that prejudice against atheists may persist even in secular cultures, either as part of a suite of adaptations linking belief to within-group cooperation[20], or as a consequence of culturally transmitted[21] and entrenched pro-religious norms[22]. Indeed, recent studies suggest religions evolved in part by supporting trust and cooperation among coreligionists[15,23,24]. Signals of religiosity can even extend trust across religions among believers, though not to nonbelievers[25]. On the other hand, classic social psychological work[26] predicts that only believers will be prejudiced against atheists, and that distrust of atheists would not be apparent in secular societies. To date, these two perspectives have not been directly contrasted, and the global prevalence of intuitive anti-atheist prejudice and its persistence among atheists themselves is currently unknown. A recent Pew survey suggests a relationship between country-wide levels of religious belief and explicit judgments that morality requires religion[15]. However, people often lack introspective access to their intuitions, and respond to appear socially desirable. As such, little is known about the potential cross-cultural ubiquity of intuitions linking religion and morality.

Here, we test a prediction derived from a cultural evolutionary model of religion[22]: that anti-atheist prejudice remains globally prevalent, even in secular societies

and among atheists. In contrast to previous studies, we quantify levels of anti-atheist distrust using well-tested measures of intuitive information processing that can be adapted for studying prejudice in a large and diverse cross-cultural sample, while adjusting for individual differences in level of religious belief, demographic covariates, and country-level dependencies in responses. Our sample is drawn from 13 countries on 5 continents. We chose these countries because they 1) exhibit substantial country-level variability in average religious belief including both highly secular societies (e.g., Netherlands, Czech Republic, Finland, China) and highly religious ones (e.g., United Arab Emirates, Mauritius, India. *Supplementary Table 3* shows average belief in gods across countries); 2) represent diverse dominant religions and religious histories, including countries with Christian, Muslim, Hindu, Buddhist, and secular majorities; and 3) represent diverse cultural, political, socioeconomic, historical, and geographical contexts. This diverse sample allowed us to extend our investigation well beyond the WEIRD (Western, educated, industrialized, rich, democratic) samples that predominate the social sciences[27].

We developed a measure to assess extreme anti-atheist prejudice using a simple experimental design that targets intuitive biases[19]. In this task, participants read a description of a man who tortures animals as a child, then as an adult exhibits escalating violence culminating with the murder and mutilation of five homeless people. Then, participants judged whether it is more probable that the villain was: A) a teacher, or B) a teacher who is also (manipulated between subjects) a religious believer/ does not believe in gods. Thus, no individual participant is directly asked whether they think the perpetrator is or is not a believer. Instead, the conjunction fallacy[28] rates (choosing option

B—a logically incorrect answer) between conditions can be used to indirectly infer the degree to which a description of a serial murderer is intuitively seen as more representative of religious people or atheists, respectively. Full stimuli appear in the *Supplement*. In our preregistration of methods and hypotheses before data collection commenced (https://osf.io/f6tcr/), we hypothesized both universality and variability across countries, such that moral distrust of atheists would be evident in all sites, but the strongest intuitive religion-morality links would be observed in the most strongly religious samples.

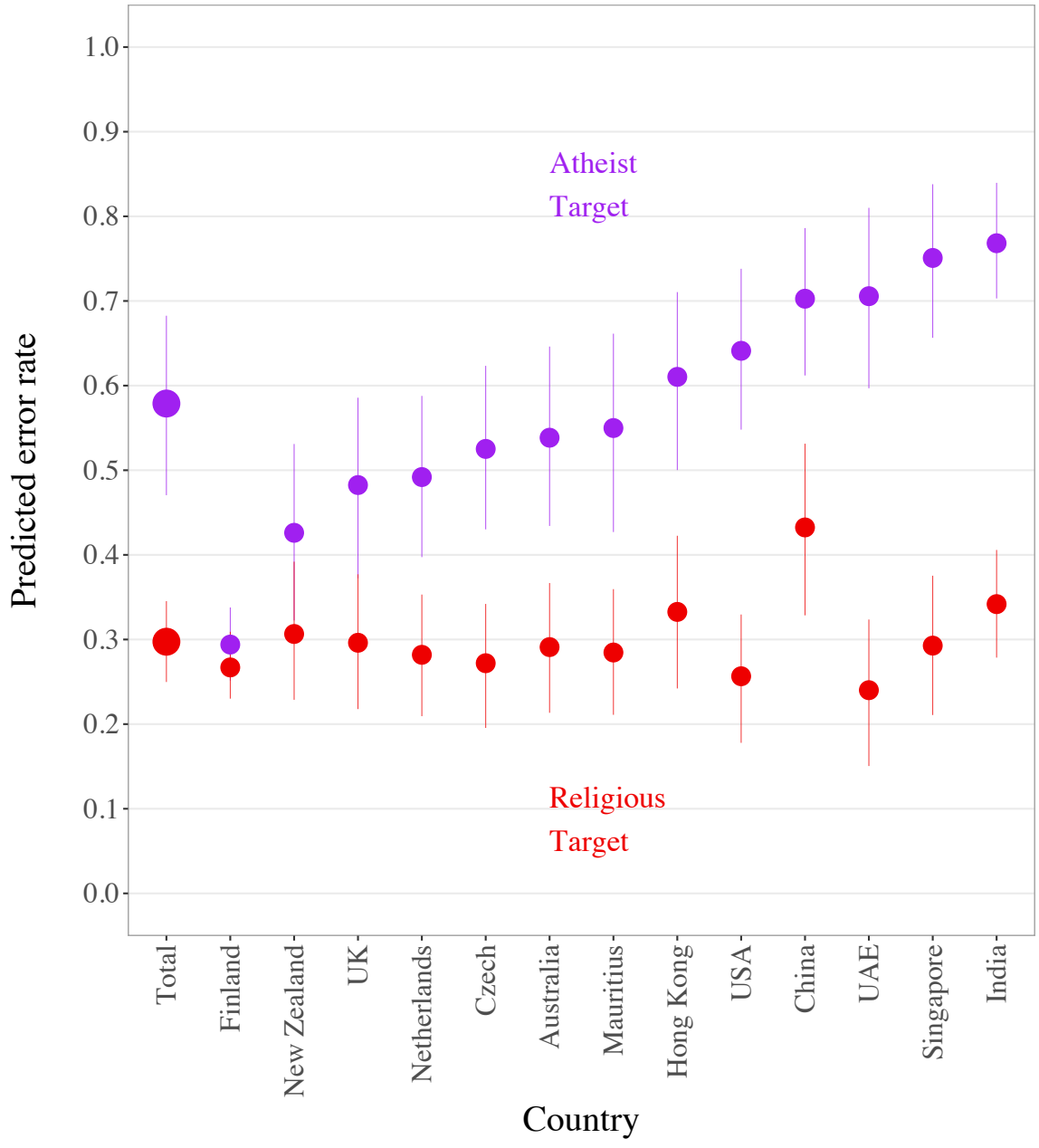
We conducted identical experiments in all 13 sites. We targeted at least 100 participants per experimental condition (anti-atheist bias vs. anti-religious bias). After filtering out inattentive participants (13%) and incomplete responses, there were a total of 3256 participants for final analysis (69% female, Age 16-70: $M = 25.07$, $SD = 7.84$), with a median of 162 participants per country (range: 129-993). Participants came from diverse societies and included both student and general population samples (*Supplement*).

Because our data represent a shared experimental design across sites with participants nested within countries, we utilized a multilevel (hierarchical) modeling approach. Specifically, our hierarchical Bayesian model[29] quantifies the extent to which people view gross immorality (animal torture, serial murder, and mutilation) as more representative of atheists than of believers, both overall and within each country, adjusting for individual levels of belief in God, gender, age, and perceived socioeconomic status (all standardized). Additionally, the model adjusts for country-level dependencies by modeling the intercept and slope of anti-atheist prejudice as random across countries (*Supplement*). Full model coefficients appear in Table 1. We observed

substantial heterogeneity in overall conjunction fallacy performance across countries. Because our primary focus was on degrees of intuitive moral distrust of atheists (in contrast to believers) across countries, we do not speculate further about sources of heterogeneity in overall performance, and instead focus on experimental condition differences within countries.

Our results offer strong evidence of extreme intuitive moral prejudice against atheists. Our model predicts overall conjunction error rate probability of .58 for atheist targets (95% highest posterior density interval [.48, .68]), but only .30 [.25, .34] for religious targets, *Relative Risk (RR)* = 1.96 [1.53, 2.37], posterior probability of atheist target errors exceeding religious target errors (henceforth posterior probability) exceeds .999. Thus, people overall are roughly twice as likely to view extreme immorality as representative of atheists, relative to believers. Importantly, the effects hold even after adjusting for country variability in the strength of intuitive moral prejudice and individual-level variability in demographics. Figure 1 and Table 2 summarize model predicted conjunction error probabilities across sites for atheist and religious targets. Consistent with predictions, extreme intuitive moral distrust of atheists is both globally evident and variable in its magnitude across countries.

**Figure 1. Across 13 countries, serial murder was seen as more representative of atheists than of religious believers**. Predicted error probabilities are presented for the total estimate and all 13 sites.



149 **Table 1. Full model summary.** Age, gender, subjective socioeconomic status, and
150 participant belief in God were standardized. Target was coded: atheist = 1, religious = 0.
151 95% highest posterior density interval illustrates uncertainty around posterior means, and
152 indexes the interval in which the 95% most credible estimates lie.
153

| | coefficient | $SD_{coef}$ | 95% HPDI | |
|---|---|---|---|---|
| | | | Low | High |
| **Fixed Effects** | | | | |
| Belief | 0.10 | 0.06 | -0.03 | 0.23 |
| Age | 0.11 | 0.05 | 0.01 | 0.19 |
| Female | 0.03 | 0.04 | -0.04 | 0.11 |
| SSES | 0.03 | 0.04 | -0.06 | 0.11 |
| Belief x Target | 0.11 | 0.09 | -0.07 | 0.29 |
| **Random Intercepts** | | | | |
| Total | -0.86 | 0.12 | -1.09 | -0.63 |
| Australia | -0.90 | 0.19 | -1.27 | -0.51 |
| China | -0.28 | 0.22 | -0.70 | 0.15 |
| Czech | -0.99 | 0.19 | -1.38 | -0.62 |
| Finland | -1.01 | 0.10 | -1.22 | -0.82 |
| Hong Kong | -0.70 | 0.21 | -1.11 | -0.28 |
| India | -0.66 | 0.15 | -0.95 | -0.37 |
| Mauritius | -0.93 | 0.19 | -1.31 | -0.57 |
| Netherlands | -0.94 | 0.18 | -1.30 | -0.57 |
| New Zealand | -0.82 | 0.20 | -1.21 | -0.43 |
| Singapore | -0.90 | 0.21 | -1.31 | -0.50 |
| UAE | -1.17 | 0.26 | -1.66 | -0.67 |
| UK | -0.87 | 0.20 | -1.26 | -0.48 |
| USA | -1.08 | 0.21 | -1.50 | -0.69 |
| **Random Slopes (Target)** | | | | |
| Total | 1.19 | 0.22 | 0.74 | 1.62 |
| Australia | 1.06 | 0.28 | 0.51 | 1.62 |
| China | 1.15 | 0.30 | 0.55 | 1.71 |
| Czech | 1.10 | 0.27 | 0.55 | 1.63 |
| Finland | 0.13 | 0.15 | -0.14 | 0.43 |
| Hong Kong | 1.16 | 0.31 | 0.56 | 1.75 |
| India | 1.87 | 0.23 | 1.44 | 2.35 |
| Mauritius | 1.13 | 0.29 | 0.57 | 1.72 |
| Netherlands | 0.91 | 0.26 | 0.39 | 1.42 |
| New Zealand | 0.52 | 0.29 | -0.06 | 1.08 |
| Singapore | 2.02 | 0.32 | 1.41 | 2.65 |
| UAE | 2.06 | 0.36 | 1.35 | 2.76 |
| UK | 0.80 | 0.29 | 0.21 | 1.34 |
| USA | 1.66 | 0.29 | 1.13 | 2.24 |

154

155 **Table 2**: **Model summary at mean belief in God** (50.91 out of 100). Predicted
156 conjunction error probabilities for both atheist and religious targets [with 95% highest
157 posterior density intervals], along with relative risks [95% HPDI], and posterior
158 probability of atheist target error rates exceeding religious target error rates, Pr(A > R).
159 Relative risk = Pr(atheist target error) / Pr(religious target error). UAE = United Arab
160 Emirates, UK = the United Kingdom, USA = United States of America.
161

| | N | Atheist | Religious | Relative Risk | pr(A >R) |
|---|---|---|---|---|---|
| **Total** | 3256 | 0.58 [0.48, 0.68] | 0.30 [0.25, 0.34] | 1.96 [1.53, 2.37] | > .999 |
| Australia | 158 | 0.54 [0.43, 0.65] | 0.29 [0.22, 0.37] | 1.89 [1.33, 2.55] | > .999 |
| China | 207 | 0.7 [0.62, 0.79] | 0.43 [0.32, 0.53] | 1.65 [1.23, 2.09] | > .999 |
| Czech | 187 | 0.53 [0.43, 0.62] | 0.27 [0.20, 0.34] | 1.97 [1.37, 2.66] | > .999 |
| Finland | 993 | 0.29 [0.25, 0.34] | 0.27 [0.23, 0.31] | 1.11 [0.89, 1.34] | .822 |
| Hong Kong | 129 | 0.61 [0.5, 0.71] | 0.33 [0.25, 0.43] | 1.87 [1.3, 2.48] | > .999 |
| India | 395 | 0.77 [0.69, 0.83] | 0.34 [0.28, 0.41] | 2.27 [1.82, 2.74] | > .999 |
| Mauritius | 161 | 0.55 [0.43, 0.67] | 0.28 [0.21, 0.36] | 1.96 [1.36, 2.64] | > .999 |
| Netherlands | 213 | 0.49 [0.40, 0.59] | 0.28 [0.21, 0.35] | 1.77 [1.23, 2.34] | .999 |
| New Zealand | 161 | 0.43 [0.33, 0.53] | 0.31 [0.23, 0.39] | 1.41 [0.92, 1.92] | .964 |
| Singapore | 162 | 0.75 [0.66, 0.84] | 0.29 [0.21, 0.37] | 2.63 [1.84, 3.47] | > .999 |
| UAE | 144 | 0.71 [0.60, 0.81] | 0.24 [0.15, 0.32] | 3.06 [1.95, 4.39] | > .999 |
| UK | 148 | 0.48 [0.38, 0.59] | 0.30 [0.22, 0.38] | 1.65 [1.09, 2.21] | .997 |
| USA | 198 | 0.64 [0.54, 0.73] | 0.26 [0.18, 0.34] | 2.56 [1.80, 3.48] | > .999 |

162

Surprisingly, after adjusting for substantial latent country-level dependencies between sites, the within-country interaction between individual belief in God and conjunction error rates across targets is weak (posterior probability = .88. See Table 1). Thus, while anti-atheist prejudice varies strongly by country, such prejudice is largely robust across the spectrum of participant religiosity within countries; both high and low believers are about twice as likely to commit conjunction errors for atheist targets than for religious targets (Figure 2). Further, we examined posterior model predictions for atheists (those rating their belief in God at 0 out of 100). Among atheists, our model predicts overall conjunction error rate probability of .52 for atheist targets [.40, .64], but only .28 [.22, .33] for religious targets, *RR* = 1.91 [1.41, 2.48] (posterior probability > .999). Effects hold even in highly secular countries such as Australia, China, the Czech Republic, the Netherlands, and the UK: even atheists are predicted to intuitively associate serial murder with atheists more than with believers in these countries, all posterior probabilities exceeding .98. Indeed, only in Finland (posterior probability = .48) and to a lesser extent New Zealand (posterior probability = .90) was the evidence of intuitive anti-atheist prejudice among atheists less conclusive (Full inferences at both minimum and maximum belief appear in the *Supplement*). As a robustness check of intuitive moral distrust of atheists among atheists, we conducted a second analysis isolating all participants across sites who rated their belief in God at zero ($N = 553$) and explored overall atheist intuitive moral distrust of atheists (experimental condition treated as fixed) across sites (varying intercepts of country). Once again, atheist participants showed higher conjunction error rates for atheist targets, .61 [.23, .95], than for religious targets,

.50 [.12, .88] (posterior probability = .999). Thus, consistent with theoretical predictions, even atheists intuitively associate immorality with atheists more than with believers.

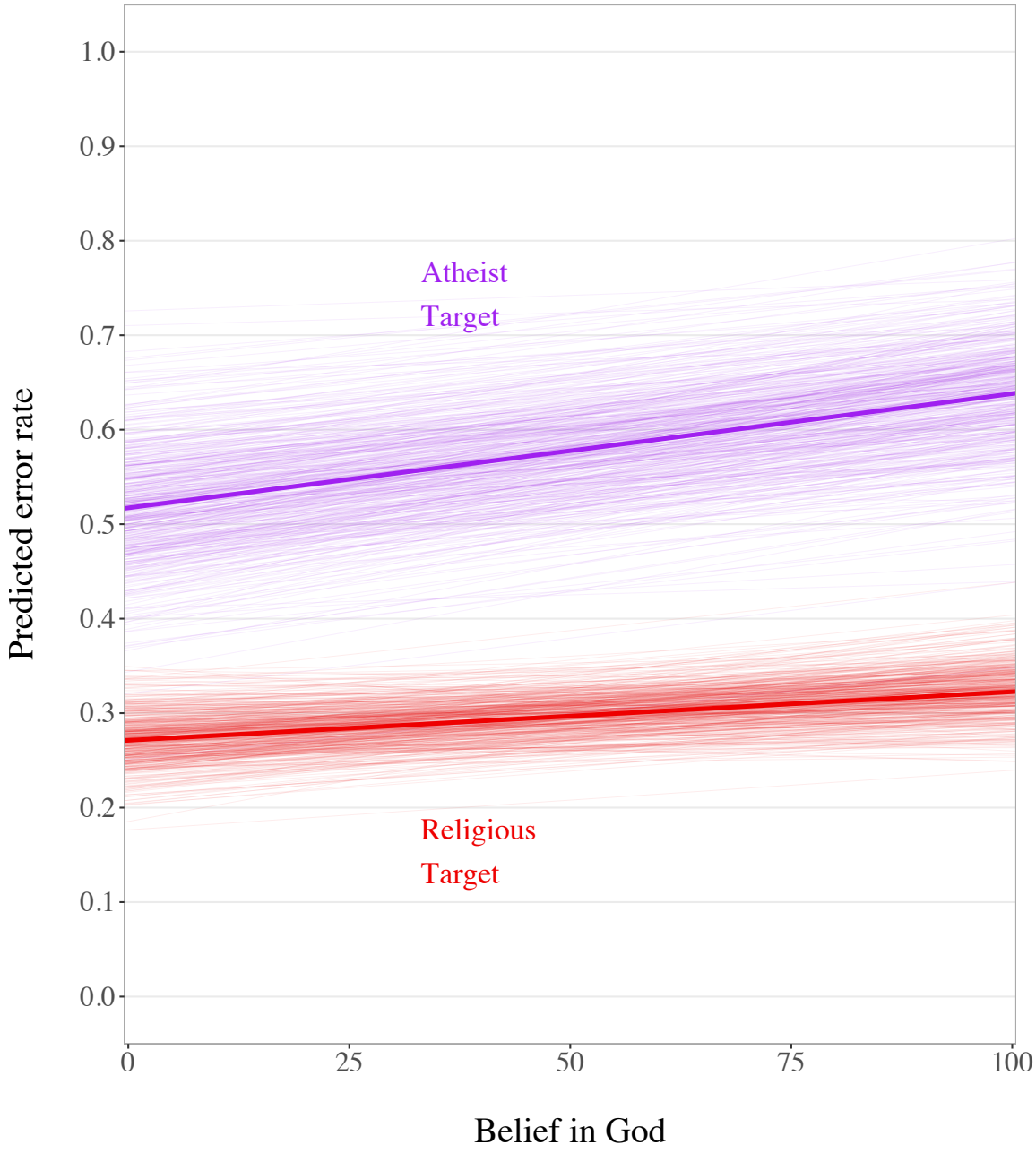



**Figure 2. Predicted effect of participant belief in God**, marginalized across countries and adjusting for individual gender, age, and subjective socioeconomic status. Bold lines are overall estimates, blurred lines display 500 best-fit lines sampled randomly from the posterior to depict estimate uncertainty.

193 To address potential methodological confounds and alternative explanations for
194 our findings, we conducted three additional experiments (we note that although our
195 primary cross cultural investigation was preregistered, the followup studies were not).
196 Full details of all three studies appear in the *Supplement*, but they are briefly summarized
197 here. First, our cross-cultural experimental manipulation tested only extreme moral
198 violations and pitted a target "who does not believe in god(s)" against "a religious
199 believer," perhaps confounding notions of belief in god and the broader construct of
200 religiosity. *Study S1* found that even when the experiment more symmetrically
201 manipulates belief vs. disbelief in god(s) and tests a more minor moral violation (not
202 paying for dinner in a restaurant), people still associate immorality more with atheists
203 than with believers (posterior probability = .981).
204 Second, our primary cross-cultural tests pitted a disbeliever in god(s) against a
205 religious believer. It is possible, however, that people are morally distrustful of
206 disbelievers in general, rather than of people who disbelieve in gods specifically. *Study*
207 *S2* used the same extreme moral violation as our main analysis and found that people
208 were more likely to intuitively assume that a perpetrator of moral evil was someone who
209 disbelieved in God than someone who disbelieved in evolution, the accuracy of
210 horoscopes, the safety of vaccines, or the reality of global warming (all posterior
211 probabilities between .956 and .9997).
212 Finally, it is possible that people may intuitively associate certain specific moral
213 violations, such as child molestation, with religious individuals rather than atheists.
214 However, *Study S3* found that people intuitively assume that a priest who molests young

boys for decades is more likely to be a priest who does not believe in God than a priest who believes in God (posterior probability = .998).

In sum, participants intuitively assume that the perpetrators of immoral acts are probable atheists. These effects appeared across religiously diverse societies, including countries with Buddhist, Christian, Hindu, Muslim, and nonreligious majorities, showing that intuitive moral prejudice against atheists is not exclusive to Abrahamic or monotheistic majority societies. To the contrary, intuitive anti-atheist prejudice generalizes to largely secular societies, and appears globally evident even among atheists.

Notably, our primary experimental paradigm used extreme examples of immorality where anti-atheist prejudice would presumably be less explicitly defensible. We tested moral prejudice using vicious acts of cruelty (animal torture, serial murder, and mutilation), which participants—including atheist participants—nonetheless intuitively associated with atheists. Combined, these results imply that across the world, religious belief is intuitively viewed as a necessary safeguard against the temptations of gross immoral conduct, and atheists are broadly perceived as potentially morally depraved and dangerous. Viewed differently, people viewed belief in a god as a sufficient moral buffer to inhibit immoral behavior.

Our results highlight a stark divergence between lay and scientific perceptions of the relationship between religion and morality. Although religion likely influences many moral outcomes and judgments[3,23,24], core moral instincts appear to emerge largely independent of religion[30,31]. Additionally, highly secular societies are among the most stable and cooperative on earth[14]. Nonetheless, our findings reveal widespread suspicion that morality requires belief in a god. For many people, including many atheists, the

238 answer to Dostoevsky's[18] question, "Without God….It means everything is permitted
239 now, one can do anything?" is "yes", inasmuch "everything" refers to acts of extreme
240 immorality.

241 Religions underpin large-scale intragroup cooperation[3], but also promote distrust
242 of nonbelievers[13,19] who are excluded from such religious moral communities[3,25]. Does
243 rising secularism[14,32] moderate effects - as atheist norms become stronger within
244 societies? The present findings suggest that intuitive moral suspicion of atheists is
245 culturally widespread though not universal. Given that intuitive anti-atheist biases may
246 transfer across moral domains[19] (*Studies S1 & S3*), the resilience of moral prejudice
247 against atheists reveals a potential barrier to the full acceptance of this growing segment[32]
248 of the global population. Consistent with predictions derived from cultural evolutionary
249 theories of religion and morality[22], extreme intuitive moral distrust of atheists is evident
250 globally, among believers and atheists in both religious and secular societies. Even as
251 secularism reduces overt religiosity in many places[14], religion has apparently still left a
252 deep and abiding mark on human moral intuitions.

253 **Methods**

254 Data collection proceeded among teams acting locally across all thirteen
255 countries. Local ethics approval was completed by individual research teams within each
256 country.

257 The experiment employed a version of the representativeness heuristic[28]. In the
258 classic version of this task, participants are given a description of a politically liberal,
259 single woman. When asked whether it is more likely that she is A) a bank teller, or B) a
260 bank teller who is active in the feminist movement, participants tend to erroneously pick

option B. Although logically incorrect (there are necessarily at least as many bank tellers as bank tellers who are feminists), the description seems more representative of the double identity provided in option B, leading people to intuitively choose that option (termed the conjunction fallacy). By independently varying the contents of the description and the identities implied by option B, researchers can assess the degree to which people intuitively view a given description as representative of different identities[19].

We generated a representativeness heuristic task to quantify the degree to which people around the world intuitively view religion as necessary for the inhibition of gross immoral behavior. We provided a description of an immoral person who initially tortures animals and eventually kills people for thrills (see *Supplement*), and then asked whether it was more probable that the perpetrator was A) a teacher, or B) a teacher who either (manipulated between subjects) does not believe in God, or is a religious believer. Higher conjunction fallacy rates (picking option B) in the atheist condition indicate that people intuitively view serial murder as more representative of atheists than of religious believers [19]. This manipulation allowed us to test the relationship between intuitive distrust of atheists and personal religious belief, while adjusting for countrywide variation in this relationship, as well as demographic covariates.

**Analytic strategy.** The nested structure of our data required a multilevel (e.g., hierarchical) modeling strategy to generate aggregate inferences. Failure to adopt such a strategy can lead to serious and potentially misleading inferential errors[33]. Our analyses relied on Bayesian hierarchical modeling[29] using the rethinking package[34] in R. Bayesian approaches provide researchers a number of pragmatic benefits[35], including the use of

284 intuitive statements (e.g., posterior probabilities) about the probability of experimental
285 manipulations producing effects across countries, as well as the relative credibility or
286 plausibility of different potential parameter values[29,36]. In addition, hierarchical (e.g.,
287 multilevel) models can mitigate some problems associated with multiple comparisons[37]
288 —comparisons that could be especially concerning in the present study, which evaluated
289 intuitive moral distrust of atheists across 13 countries while adjusting for individual
290 demographics. Further, Bayesian estimation allowed us to represent the estimate
291 uncertainty using highest posterior density intervals which represent the range in which
292 the most credible parameter values lie. This approach is in contrast to frequentist
293 confidence intervals, which only present a range of possible values that would contain the
294 true parameter value a known proportion of the time were this study repeated a very large
295 number of times, although frequentist confidence intervals are often intuitively
296 misunderstood as if they had the properties of Bayesian posterior density intervals[38]. Our
297 primary inferences are drawn from probing samples from the posterior from a single
298 hierarchical model. In it, we modeled random intercepts of country and modeled effects
299 of target (atheist vs. believer) as random across country, with all other factors fixed
300 across country. Alternative model specifications did not appreciably change inferences.

301 **Data Availability.** Data and code are freely available at https://osf.io/f0upy/

302 **Competing Interests.** We declare no competing interests.

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393 **Supplementary Information** is linked to the online version of the paper at

394 www.nature.com/nature.

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**Author Contributions**

WMG developed the study design in consultation with all the authors. WMG and JB performed the analyses. WMG, DX, MvE, JB, and RMcK wrote the manuscript with input from all authors. All authors were involved in data collection.

**Global evidence of extreme intuitive moral prejudice against atheists**

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## Supplementary Information

## Supplementary Methods

### Baseline Methods

Here is the baseline set of methods. Some countries tweaked elements of this (e.g., used different religious categories, measured political attitudes differently). These differences are noted in their data, translated methods, and in the data summaries.

### Methods

The methods are simple: participants answered one representativeness heuristic question, three other logic puzzles that acted as a smokescreen, one item included to ensure people are paying attention (e.g., Oppenheimer, Meyvis, & Davidenko, 2009), and basic demographics.

### I. Representativeness Heuristic task.

Participants began with a single representativeness heuristic task with a description of an unambiguously immoral character. Between subjects, we manipulated the contents of Option #2:

> *When a man was young, he began inflicting harm on animals. It started with just pulling the wings off flies, but eventually progressed to torturing stray cats and other animals in his neighborhood.*
>
> *As an adult, the man found that he did not get much thrill from harming animals, so he began hurting people instead. He has killed 5 homeless people that he abducted from poor neighborhoods in his home city. Their dismembered bodies are currently buried in his basement.*
>
> Which is more probable?
> 1. The man is a teacher
> 2. The man is a teacher and [does not believe in any gods. / is a religious believer.]

### II. Attention Check.

> Here is a different type of question. SKIP THE NEXT QUESTION. It is only included to ensure that you are paying attention and reading directions. Do not leave an answer for the question about US presidents.
>
> Who is the current President of the United States of America?
> a) Barack Obama
> b) Mitt Romney
> c) Steve Perry

d) George Washington

We dropped participants who actually answered this question.

**III. Distractor Items**

| |
|---|
| A bat and a ball cost $1.10 in total. The bat costs $1.00 more than the ball. How much does the ball cost? ____cents |
| If it takes 5 machines 5 minutes to make 5 widgets, how long would it take 100 machines to make 100 widgets? _____minutes |
| In a lake, there is a patch of lily pads. Every day, the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half of the lake? _____days |

**IV. Suspicion check**

**What do you think this study is mainly about so far?**

a) Stereotyping and prejudice
b) Logic and reasoning
c) Language fluency
d) Emotion perception
e) Memory

**V. Demographics**

1. How old are you? _____
2. What is your gender?
   a. Male
   b. Female
   c. Other

3. What is your religious affiliation?
    a. Christian (Catholic)
    b. Christian (Baptist)
    c. Christian (Other)
    d. Hindu
    e. Buddhist
    f. Muslim
    g. Jewish
    h. Sikh
    i. None
    j. Atheist
    k. Agnostic
    l. Other (Please specify)

4. How strongly do you believe in God or gods (from 0-100)? To clarify, if you are certain that God (or gods) does not exist, please put "0" and if you are certain that God (or gods) does exist, then put "100." _____

5. How would you describe your race/ethnicity?

    a. White/Caucasian
    b. Hispanic/Latino
    c. Black/African American
    d. American Indian/Alaskan Native
    e. Asian
    f. Native Hawaiian/Pacific Islander
    g. Mixed
    h. Other: _____

6. We are interested in your political beliefs. Would you consider yourself more liberal or conservative? Select an option below:
    a. Very liberal
    b. Liberal
    c. Slightly liberal
    d. Moderate
    e. Slightly conservative
    f. Conservative
    g. Very conservative

7. We are interested in how you perceive your life. Think of a ladder representing where people stand in [insert country here]. At the top of the ladder are the people who are the best off–those who have the most money, the most education, and the most respected jobs. At the bottom are the people who are the worst off–who have

the least money, least education, and the least respected jobs or no job. The higher up you are on this ladder, the closer you are to the people at the very top; the lower you are, the closer you are to the people at the very bottom. Imagine this rating scale represents the ladder. Where would you place yourself, relative to other people in [insert country here]?

   a. Rating scale from 0 (Bottom) to 10 (Top)

8. Location: City _____ State/Province _____

9. "What is the highest degree of education you have completed?"

   a. Some high school
   b. Completed high school or equivalent
   c. Some university/college
   d. Completed university/college
   e. Some postgraduate work
   f. Completed a postgraduate degree

**Sampling and Demographics**

Additional sampling and demographic information is presented in Supplementary Tables 1-4

**Additional modeling details**

All analyses were conducted in R[34,39-41].

Overall, 35.9% of the sample made errors in the control condition, whereas 64.1% made errors in the experimental Atheist condition ($X^2=163.512, df=1, \Phi=.225, p<.001$). See Supplementary Table 2.

There was substantial heterogeneity by country in the error rates. Notably, 31.13% of the total sample (n=993) were from Finland, where the error rate in the experimental condition was only 28% which is similar to the baseline error rate of 26.7% in this country ($X^2=0.140, df=1, \Phi=.014 \cdot p=.709$). Country-level differences are in accordance with our experimental hypothesis that culturally evolved country level differences in anti-atheist prejudice.

The proportion of errors in both experimental conditions for each country are giving in Supplementary Table 2.

We next turned to estimate country level differences in religious belief. We first calculated an Interclass Correlation Coefficient for Belief in God by Country using a random coefficient model. This estimates the proportion of within country variation in religious belief relative to between country variation at the level of participants. The $ICC_{Belief} = 0.335$, indicating high levels of country-level clustering in religious belief, a finding consistent with other studies investigating global variation in religious belief (e.g., the World Values Survey).

Evidence of marked country-level heterogeneity both in experimental outcomes and in religious beliefs suggests the need to appropriately handle country dependencies.

We modelled the expected error rates using a Bayesian multilevel model in R using McElreath's Rethinking package[29]. Bayesian regression yields results with transparent and intuitive probabilistic interpretations: the posterior distributions that are generated are probabilistic distributions for modelled associations, which are conditional on the data, model, and priors. Priors for the effects modelled as fixed in the current study weakly regularizing, with a mean of zero and standard deviation of 1. Varying slopes and intercepts used adaptively regularizing priors[29]. The full model code is available at https://osf.io/f0upy/

**Access to materials and data**

All materials and methods (including translated materials for some countries), as well as all raw data, is available at the following link:

https://osf.io/f0upy/

Our initial study registration can be found here:

https://osf.io/f6tcr/

Our experimental methods were uploaded on November 12, 2013. Due to a technical oversight, formal preregistration did not occur until August 26, 2015. Experimental protocol went unchanged during this time.

# Supplementary Notes

## Atheist and maximum belief inferences

In the main manuscript, we report some inferences regarding atheist participants. To do so, we used our full model posterior and evaluated predictions at minimum level of belief on God (0 out of 100). Supplementary Table 5 summarizes inferences across all sites.

In the main manuscript, we report some inferences regarding participants at maximum belief in God. To do so, we used our full model posterior and evaluated predictions at maximum level of belief on God (100 out of 100). Supplementary Table 6 summarizes inferences across all sites.

1

2

3

## Supplementary Studies

### Study S1

**Overview.** Our primary cross-cultural experiment tested whether, when given a description of someone engaging in animal torture and serial murder, people intuitively assumed that the perpetrator was an atheist. Notably, this experiment focused on a rather extreme moral violation. In addition, the primary experimental contrast across conditions was between someone who "does not believe in any gods" and someone who "is a religious believer." This phrasing may have led participants to conflate issues of belief in a god with the broader construct of religiosity, which may connote additional norms and behaviors. To simultaneously address both of these concerns, we conducted a study in which we tested whether participants intuitively assume that the perpetrator of a more mundane moral violation is also an atheist. For symmetrical framing, we contrasted conditions in which the conjunction target was framed in terms of either belief or disbelief in God.

**Method.** We recruited 205 American participants from Amazon Mechanical Turk (Age: $M = 34.4$, $SD = 11.2$; Belief in God [0-100]: $M = 43.4$, $SD = 41.2$; 44% female). We presented participants with the following vignette of a mundane moral violation and conjunction question [experimental conditions in brackets]:

> "A 42 year-old woman was out of town on vacation. She had dinner at a restaurant, finished her meal, and left without paying the bill.
>
> Which is more probable?
> a) The woman is a teacher
> b) The woman is a teacher and [**does**/ **does not**] believe in God"

**Results.** As with main analyses, we utilized Bayesian estimation and present model predicted conjunction error probabilities [with 95% HPDIs]. Given a description of a mundane moral violation, participants were more likely to commit conjunction errors for targets who do not believe in God, .31 [.22, .40], than targets who do believe in God, .19 [.12, .26], posterior probability = .99.

**Summary.** Study S1 suggests that moral distrust is evident in—but not exclusive to—extreme moral violations. In addition, it appears that inferences about belief in God, rather than religiosity more broadly, are sufficient to generate these effects.

## Study S2

**Overview.** Our primary cross-cultural experiment suggested that people intuitively assume that the perpetrators are likely to disbelieve in gods. It is possible that this intuition was not driven by an association between religion and moral restraint, but rather by a general disbelief bias: that, if all we know is something someone does not believe, we cannot infer what they do believe, and as such treat them as potential moral wildcards. Study S2 used the same extreme moral violation as the primary analysis and the conjunction task pitted targets who disbelieve in God against disbelievers of other stripes. We chose a disparate assortment of disbeliefs that span the political and religious spectra.

**Method.** We recruited 394 American participants from Amazon Mechanical Turk (Age: $M = 33.6$, $SD = 10.5$; Belief in God [0-100]: $M = 41.3$, $SD = 40.8$; 45% female). We presented participants with the same moral violation used in the main analysis, and provided potential targets who disbelieve in God, evolution, horoscopes, global warming, or vaccine safety (manipulated between subjects).

**Results.** As with main analyses, we utilized Bayesian estimation and present model predicted conjunction error probabilities [with 95% HPDIs]. Given a description of a mundane moral violation, participants were more likely to commit conjunction errors for targets who do not believe in God than targets who disbelieve in evolution, horoscopes, vaccine safety, or global warming, see Supplementary Table 7.

**Summary.** Our main study suggests extreme moral distrust of people who do not believe in gods. Study S2 suggests that this effect does not readily generalize to various other specific disbeliefs.

## Study S3

**Overview.** Our primary cross-cultural investigation suggested that extreme moral violations are intuitively associated with atheists. However, it is possible that other extreme moral violations might, in fact, suggest a religious perpetrator. Specifically, given the prominence of sex abuse scandals in the Catholic church, it is possible that people might intuitively assume that the perpetrators of chronic child molestation might in fact be men of the cloth. In addition, none of our previous studies explored whether moral impropriety might outweigh other overt cues that one is religious in people's intuitive attributions of atheism to moral violators. Study S3 tested whether people would assume that a serial child molester who also happens to be a priest is, in fact, a priest who does not believe in God.

**Method.** We recruited 265 participants from the University of Kentucky campus in Lexington, KY, USA (Age: $M = 21.7$, $SD = 6.7$; Belief in God [0-100]: $M = 70.8$, $SD = 34.1$; 57% female). We presented participants with the following vignette [experimental conditions in brackets]:

> "Keith is a well-respected figure in his community. All his friends describe him as a very caring and friendly 60-year-old-man. However, Keith actually spends most of his free time luring young boys into his office to molest them. In the past 10 years, Keith has molested over 30 boys.
>
> Which is more probable?
> a) Keith is a priest
> b) Keith is a priest and [**believes**/ **does not believe**] in God"

**Results.** As with main analyses, we utilized Bayesian estimation and present model predicted conjunction error probabilities [with 95% HPDIs]. Given a description of a serial child molesting priest, participants were more likely to commit conjunction errors for targets who do not believe in God, .57 [.49, .65], than targets who do believe in God, .40 [.32, .48], posterior probability = .998.

**Summary.** Study S3 suggests that intuitive moral distrust extends to moral violations that could possibly be popularly associated with religious people (child molestation), given current events. Further, a description of immorality seemingly outweighed even overt evidence of religiosity, leading people to nonetheless assume that a perpetrator of serial child molestation does not believe in God, even though he is a priest.

## Supplementary Tables

**Supplementary Table 1. Sampling details.**

| Country | Sample | English | Payment | Contact |
|---|---|---|---|---|
| **Australia** | student | Y | credit | ilan.dar-nimrod@sydney.edu.au |
| **China** | community | N | money | buchtel@eduhk.hk |
| **Czech Rep.** | student | N | credit | eva.klocova@gmail.com |
| **Finland** | mixed | N | none | tapani.riekki@helsinki.fi<br>annika.svedholm@helsinki.fi |
| **Hong Kong** | student | N | lottery | buchtel@eduhk.hk |
| **India** | community | Y | money | will.gervais@uky.edu |
| **Mauritius** | community | N | none | xygalatas@uconn.com |
| **Netherlands** | student | N | credit | M.vanElk@uva.nl |
| **NZ** | student | Y | lottery | joseph.bulbulia@gmail.com |
| **Singapore** | student | Y | credit | jonathanramsay@unisim.edu.sg |
| **UAE** | student | Y | credit | maveyard@aus.edu |
| **UK** | student | Y | lottery | Ryan.McKay@rhul.ac.uk |
| **USA** | student | Y | candy | will.gervais@uky.edu |

**Supplementary Table 2. Raw descriptive statistics: Proportion conjunction errors (with 95% CIs) for atheist and religious targets.**

| Site | *Atheist Error Rate* | *95% CI* | *Religious Error Rate* | *95% CI* |
|---|---|---|---|---|
| **Australia** | .53 | [.42, .65] | .29 | [.19, .40] |
| **China** | .69 | [.59, .78] | .51 | [.41, .62] |
| **Czech Rep.** | .51 | [.40, .61] | .24 | [.16, .34] |
| **Finland** | .28 | [.24, .32] | .26 | [.22, .30] |
| **Hong Kong** | .67 | [.56, .77] | .34 | [.23, .46] |
| **India** | .80 | [.74, .86] | .39 | [.32, .46] |
| **Mauritius** | .56 | [.43, .68] | .27 | [.19, .37] |
| **Netherlands** | .43 | [.34, .53] | .25 | [.17, .35] |
| **New Zealand** | .38 | [.28, .49] | .29 | [.20, .40] |
| **Singapore** | .78 | [.68, .87] | .28 | [.19, .39] |
| **UAE** | .77 | [.66, .86] | .17 | [.09, .28] |
| **UK** | .47 | [.35, .58] | .29 | [.19, .41] |
| **USA** | .65 | [.56, .74] | .25 | [.17, .35] |
| **Aggregate** | .52 | [.50, .54] | .30 | [.27, .32] |

**Supplementary Table 3. General demographics.**

| Country | Age *M* [*SD*] | Female % | Belief *M* [*SD*] | Educ. *Mdn* | SSES *M* [*SD*] | Cons. Pol. *M* [*SD*] |
|---|---|---|---|---|---|---|
| **Australia** | 20.0 [5.12] | 70 | 53.9 [38.5] | Some univ | 6.60 [1.48] | 3.53 [1.41] |
| **China** | 29.8 [5.95] | 63 | 28.7 [35.7] | University | 6.84 [1.57] | 3.38 [1.43] |
| **Czech Rep.** | 22.0 [2.08] | 68 | 47.2 [39.8] | -- | 3.53 [1.15] | 4.47 [1.15] |
| **Finland** | 28.1 [8.22] | 73 | 31.3 [35.3] | University | 5.99 [1.59] | -- |
| **Hong Kong** | 21.3 [3.39] | 80 | 63.2 [36.1] | Some univ | 4.90 [1.66] | 2.89 [1.08] |
| **India** | 32.3 [9.44] | 65 | 85.0 [26.9] | University | 4.93 [1.51] | 3.34 [1.41] |
| **Mauritius** | 21.7 [1.33] | 47 | 76.5 [39.2] | Some univ | 4.07 [4.06] | 2.86 [1.42] |
| **Netherlands** | 19.5 [2.14] | 75 | 21.2 [29.9] | University | 6.78 [1.45] | 4.14 [2.75] |
| **New Zealand** | 23.1 [7.94] | 67 | 42.0 [39.5] | Some univ | 6.01 [1.60] | 2.69 [1.60] |
| **Singapore** | 20.8 [1.69] | 68 | 69.8 [30.3] | HS* | 5.53 [1.48] | 3.57 [1.30] |
| **UAE** | 19.9 [1.56] | 60 | 94.3 [18.9] | HS* | 6.80 [1.34] | -- |
| **UK** | 25.1 [9.29] | 67 | 35.1 [37.1] | Some univ | 6.29 [1.78] | 3.24 [1.23] |
| **USA** | 19.1 [2.33] | 80 | 83.4 [29.2] | Some univ | 6.39 [1.50] | 3.98 [1.56] |
| **Aggregate** | 25.2 [7.99] | 69 | 51.2 [41.4] | Some univ | 5.58 [2.02] | 3.49 [1.63] |

*Median education was listed as "Completed High School" despite the fact that all students were at university ("Some University"). See Methods Packet in this document for disambiguation of items and scoring. SSES = subjective socioeconomic status. Cons. Pol = political attitudes, from 1 (Very liberal) to 7 (very conservative).

**Supplementary Table 4. Religious demographics (%).**

| Country | Christian | Hindu | Buddhist | Muslim | None | Atheist | Agnostic | Other |
|---|---|---|---|---|---|---|---|---|
| **Australia** | 41 | 2 | 4 | 4 | 14 | 15 | 15 | 5 |
| **China** | 4 | -- | 18 | -- | -- | 75* | | 3 |
| **Czech** | 36 | 4 | .5 | 1 | 3 | 31 | 18 | 6.5 |
| **Finland** | 42 | | | .4 | 25 | 18 | 11 | 3.6 |
| **HK** | 33 | -- | 3 | -- | -- | 60* | | 4 |
| **India** | 17 | 69 | .2 | 10 | .2 | 1 | 1 | 1.6 |
| **Mauritius** | 25 | 43 | 2 | 22 | 3 | 4 | .6 | .4 |
| **Neth.** | | | | | | | | |
| **NZ** | 22 | .6 | 3 | 1 | 71 | 2 | 0 | .4 |
| **Singapore** | 28 | 7 | 30 | 5 | | 30* | | |
| **UAE** | 4 | 4 | 1 | 84 | | .6* | | 6.4 |
| **UK** | 20 | 2 | 0 | 6 | 27 | 22 | 15 | 8 |
| **USA** | 79 | 0 | .4 | .4 | 10 | 4 | 5 | 1.2 |

* Notes: China and Hong Kong used slightly different religious ID options. Among other things, Atheist/agnostic was an option, rather than atheist or agnostic as separate choices. Dashes (--) indicate an option was not provided. Singapore used a "freethinker" category instead of none, atheist, and agnostic. UAE used "Non-Religious Other philosophy not listed here" category. Data taken from final data set, after dropping inattentive participants. Specific denominational demographics for the Netherlands are available in full posted dataset. Please contact Michiel van Elk for coding information.

**Supplementary Table 5: Model summary at minimum belief in God (0 out of 100).** Predicted conjunction error probabilities for both atheist and religious targets [with 95% highest posterior density intervals], along with relative risks [95% HPDI], and posterior probability of atheist target error rates exceeding religious target error rates, pr(A > R). Relative risk = pr(atheist target error) / pr(religious target error). UAE = United Arab Emirates, UK = the United Kingdom, USA = United States of America.

| | Atheist | Religious | Relative Risk | pr(A >R) |
|---|---|---|---|---|
| **Total** | 0.52 | 0.27 | 1.91 | > .999 |
| | [0.4, 0.64] | [0.22, 0.33] | [1.40, 2.45] | |
| Australia | 0.48 | 0.27 | 1.81 | .999 |
| | [0.35, 0.59] | [0.19, 0.35] | [1.16, 2.51] | |
| China | 0.65 | 0.40 | 1.63 | > .999 |
| | [0.55, 0.74] | [0.30, 0.51] | [1.18, 2.09] | |
| Czech Rep. | 0.46 | 0.25 | 1.90 | > .999 |
| | [0.36, 0.56] | [0.17, 0.32] | [1.25, 2.65] | |
| Finland | 0.24 | 0.24 | 1.00 | .489 |
| | [0.2, 0.28] | [0.20, 0.28] | [0.77, 1.24] | |
| Hong Kong | 0.55 | 0.31 | 1.83 | .999 |
| | [0.43, 0.67] | [0.22, 0.40] | [1.19, 2.53] | |
| India | 0.72 | 0.32 | 2.31 | > .999 |
| | [0.62, 0.8] | [0.24, 0.40] | [1.69, 2.95] | |
| Mauritius | 0.49 | 0.26 | 1.92 | .999 |
| | [0.36, 0.61] | [0.18, 0.34] | [1.19, 2.73] | |
| Netherlands | 0.43 | 0.26 | 1.70 | .998 |
| | [0.34, 0.53] | [0.19, 0.33] | [1.16, 2.34] | |
| New Zealand | 0.36 | 0.28 | 1.33 | .905 |
| | [0.26, 0.46] | [0.20, 0.36] | [0.83, 1.86] | |
| Singapore | 0.7 | 0.27 | 2.68 | > .999 |
| | [0.58, 0.81] | [0.18, 0.36] | [1.78, 3.79] | |
| UAE | 0.65 | 0.22 | 3.12 | > .999 |
| | [0.52, 0.78] | [0.13, 0.31] | [1.81, 4.84] | |
| UK | 0.42 | 0.27 | 1.58 | .988 |
| | [0.32, 0.53] | [0.19, 0.35] | [1, 2.19] | |
| USA | 0.58 | 0.23 | 2.56 | > .999 |
| | [0.46, 0.69] | [0.15, 0.32] | [1.63, 3.68] | |

**Supplementary Table 6: Model summary at maximum belief in God (100 out of 100).** Predicted conjunction error probabilities for both atheist and religious targets [with 95% highest posterior density intervals], along with relative risks [95% HPDI], and posterior probability of atheist target error rates exceeding religious target error rates, pr(A > R). Relative risk = pr(atheist target error) / pr(religious target error). UAE = United Arab Emirates, UK = the United Kingdom, USA = United States of America.

| | Atheist | Religious | Relative Risk | pr(A >R) |
|---|---|---|---|---|
| **Total** | 0.64 | 0.32 | 1.98 | > .999 |
| | [0.53, 0.74] | [0.27, 0.38] | [1.55, 2.41] | |
| Australia | 0.6 | 0.32 | 1.93 | > .999 |
| | [0.49, 0.71] | [0.24, 0.41] | [1.32, 2.57] | |
| China | 0.75 | 0.46 | 1.65 | > .999 |
| | [0.66, 0.84] | [0.35, 0.58] | [1.25, 2.14] | |
| Czech Rep. | 0.59 | 0.3 | 2.02 | > .999 |
| | [0.48, 0.69] | [0.22, 0.38] | [1.41, 2.7] | |
| Finland | 0.35 | 0.29 | 1.21 | .904 |
| | [0.28, 0.41] | [0.24, 0.35] | [0.89, 1.54] | |
| Hong Kong | 0.67 | 0.36 | 1.88 | > .999 |
| | [0.56, 0.77] | [0.27, 0.46] | [1.31, 2.47] | |
| India | 0.81 | 0.37 | 2.21 | > .999 |
| | [0.75, 0.87] | [0.30, 0.44] | [1.81, 2.63] | |
| Mauritius | 0.61 | 0.31 | 2.01 | > .999 |
| | [0.5, 0.72] | [0.23, 0.39] | [1.42, 2.65] | |
| Netherlands | 0.55 | 0.31 | 1.84 | > .999 |
| | [0.44, 0.65] | [0.22, 0.40] | [1.26, 2.45] | |
| New Zealand | 0.49 | 0.33 | 1.49 | .977 |
| | [0.37, 0.6] | [0.24, 0.43] | [0.97, 2.06] | |
| Singapore | 0.79 | 0.32 | 2.56 | > .999 |
| | [0.71, 0.87] | [0.23, 0.40] | [1.86, 3.36] | |
| UAE | 0.76 | 0.26 | 2.97 | > .999 |
| | [0.66, 0.84] | [0.17, 0.35] | [1.98, 4.17] | |
| UK | 0.54 | 0.32 | 1.73 | 0.997 |
| | [0.43, 0.66] | [0.23, 0.42] | [1.16, 2.34] | |
| USA | 0.7 | 0.28 | 2.56 | > .999 |
| | [0.61, 0.78] | [0.20, 0.36] | [1.85, 3.41] | |

**Supplementary Table 7: Predicted conjunction error rates across a variety of specific disbeliefs**

| Specific Disbelief | Point | Low HPDI | High HPDI | Posterior probability (relative to god) |
|---|---|---|---|---|
| God | 0.55 | 0.43 | 0.66 | --- |
| evolution | 0.26 | 0.15 | 0.36 | >.999 |
| horoscopes | 0.32 | 0.22 | 0.44 | >.999 |
| vaccines | 0.25 | 0.14 | 0.36 | >.999 |
| warming | 0.38 | 0.27 | 0.50 | 0.98 |

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